20

Signal Conditioning Modules and Terminal Boards

Isolated Signal Conditioning Modules		
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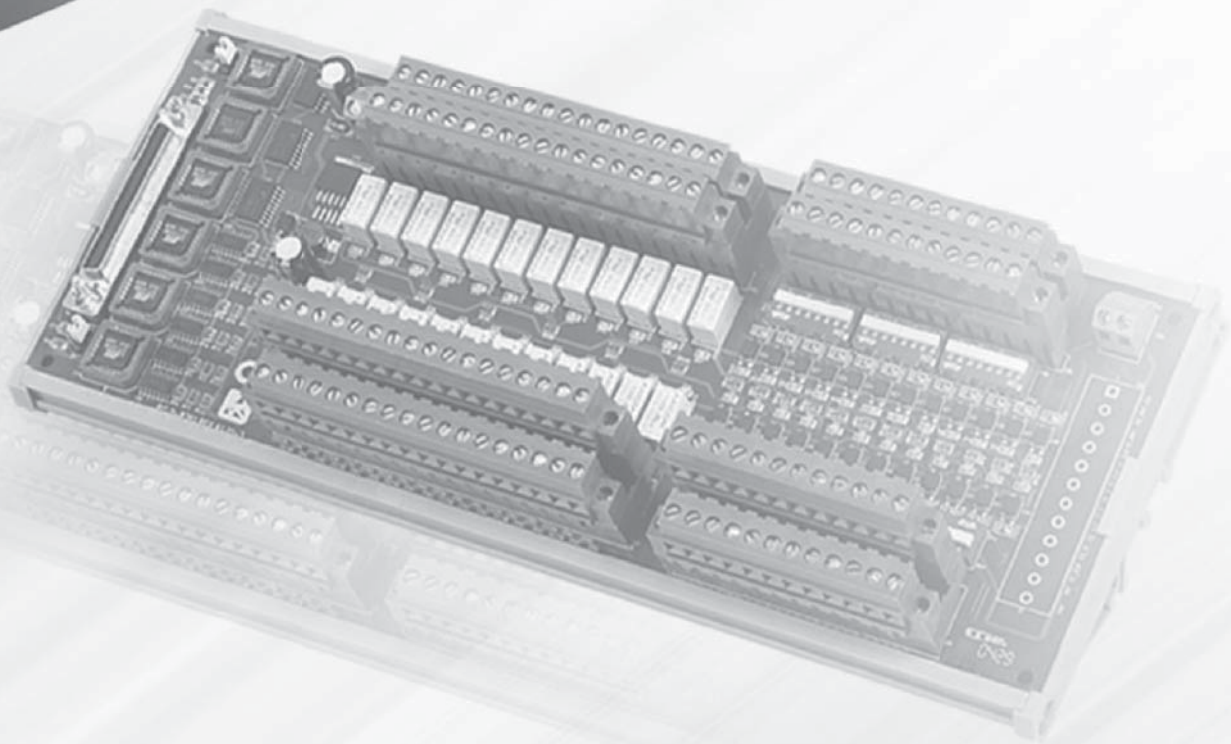
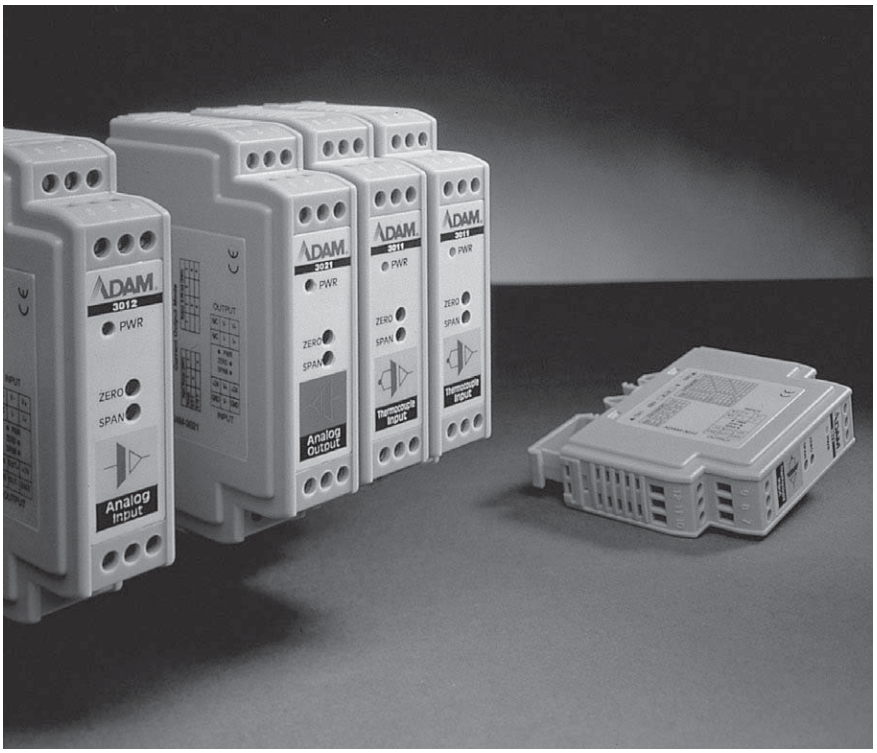
To view all of Advantech's Signal Conditioning Modules and Terminal Boards, please visit www.advantech.com/products.



ADAM-3000 Series



Features

- 1,000 V_{DC} three-way isolation
- Easy input/output range configuration
- Flexible DIN-rail mounting
- Linearized thermocouple/RTD measurement
- Low power consumption
- Wide input bandwidth

Introduction

The ADAM-3000 Series consist of the most cost-efficient, field configurable, isolation-based, signal conditioners on the market today. The modules are easily installed to protect your instruments and process signals from the harmful effects of ground loops, motor noise, and other electrical interferences.

Affordable Signal Isolation Solution

Featuring optical isolation technology, the ADAM-3000 modules provide three-way (input/output/power) 1,000 V_{DC} isolation. Optical isolation provides pin-point accuracy and stability over a wide range of operations at minimal power consumption.

Flexible Analog Data Conversion

The input/output range for the ADAM-3000 modules can be configured through switches located inside the module. The modules accept voltage, current, thermocouple or RTD as input, and pass voltage or current as output.

Thermocouple input is handled by the built-in input thermocouple linearization circuitry and a cold junction compensation function. These ensure accurate temperature measurement and accurate conversion of this information to the voltage or current output.

Configuration

The ADAM-3000 modules use 24 V_{DC} power. This electrical power wiring can be acquired from adjacent modules, which greatly simplifies wiring and maintenance. The I/O configuration switches are located inside the modules. To reach the switches, simply remove the modules from the DIN-rail bracket by sliding the modules downward.

Modular Industrial Design

The ADAM-3000 modules can be easily mounted on a DIN-rail, and signal wires can be connected through screw terminals. The screw terminals and input/output configuration switches are built inside the industrial grade plastic casing. With simple two-wire input/output cables, wiring is easy and reliable in harsh industrial environments.

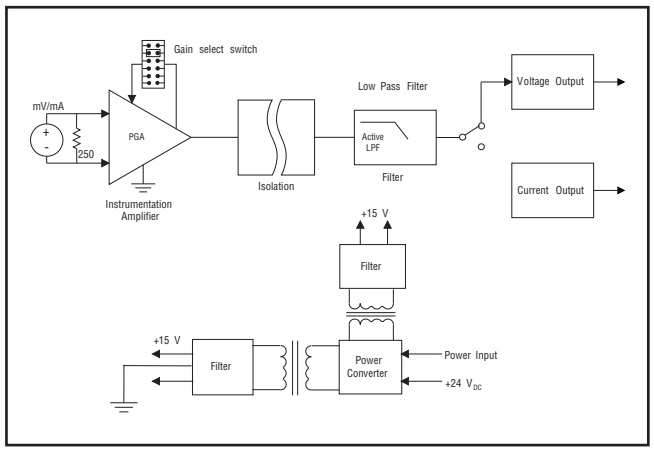
Applications

- Signal isolation
- Signal transmitters
- Thermocouple/RTD/strain gauge measurements
- Signal amplifiers
- Noise filter

Common Specifications

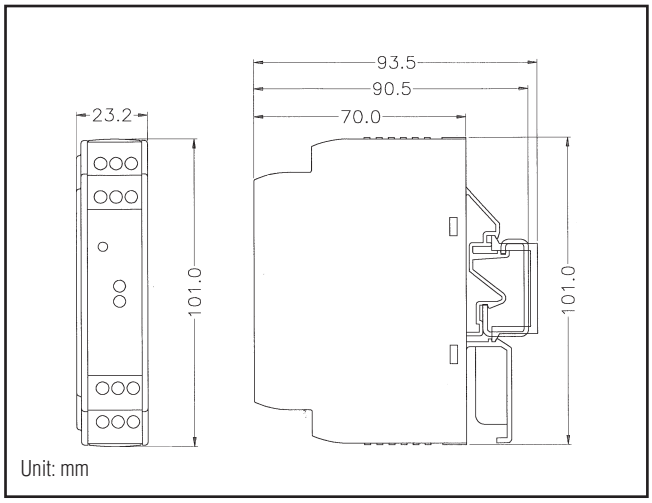
Isolation	1,000 V_{DC}
Indicators	Power LED indicator
Power Requirement	24 V_{DC} ± 10%
Case	ABS
Screw Terminal	Accepts 0.5 mm^2 ~ 2.5 mm^2 1- #12 or 2- #14 ~ #22 AWG
Operating Temperature	0 ~ 70°C (32 ~ 158°F) (ADAM-3011: 0 ~ 50°C (32 ~ 122°F))
Storage Temperature	-25 ~ 85°C (-13 ~ 185°F)

Block Diagram



Block Diagram of ADAM-3014

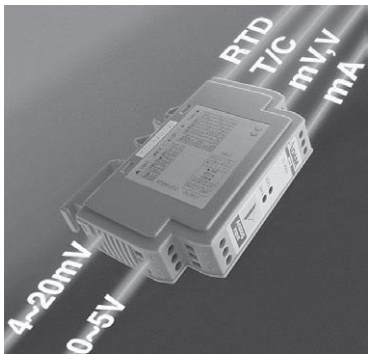
Dimensions



ADAM-3000 Series Modules

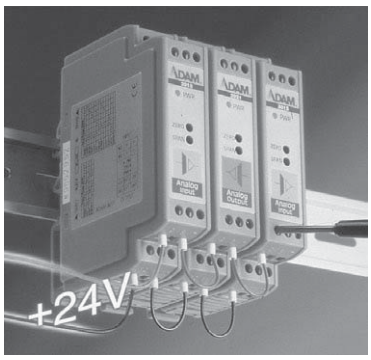
Three-way Signal Isolation

Three-way (input/output/power) 1,000 V_{DC} isolation.



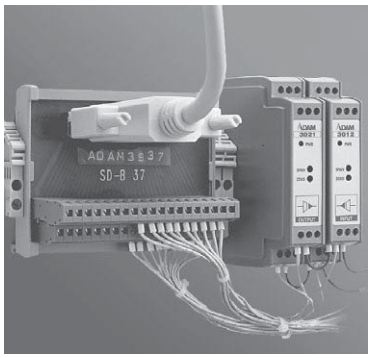
Field Configurable I/O Range

The I/O range can be configured on site with switches inside the module.



Easy Daisy Chain Power Wiring

Power can be connected conveniently from adjacent modules.



Interfacing to DAQ Cards

A wiring adapter can connect modules to a data acquisition card.

ADAM-3011
ADAM-3013
ADAM-3014

Isolated Thermocouple Input Module

Isolated RTD Input Module

Isolated DC Input/Output Module

ADAM-3011

ADAM-3013

ADAM-3014

Specifications

Thermocouple Input

- **Common Mode Rejection** 115 dB min
- **Input Type**

T/C type	Temperature Range (°C)	Accuracy at 25°C (°C)
J	-40 ~ 760	±2
K	0 ~ 1,000	±2
T	-100 ~ 400	±2
E	0 ~ 1,000	±2
S	500 ~ 1,750	±4
R	500 ~ 1,750	±4
B	500 ~ 1,800	±4

- **Isolation** 1,000 V_{DC} (Three-way)
- **Output Impedance** 0.5 Ω
- **Stability (Temperature Drift)** ±2°C
- **Voltage Output** 0 ~ 10 V

General

- **Connectors** Screw terminal
- **Enclosure** ABS
- **Indicators** Power LED indicator
- **Isolation** 1,000 V_{DC}
- **Power Consumption** 1.4 W
- **Power Input** 24 V_{DC} ± 10%
- **Operating Temperature** 0 ~ 50°C (32 ~ 122°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-3011** Isolated Thermocouple Input Module

Specifications

RTD Input

- **Accuracy** ± 0.1% of full range (voltage) or +/- 0.15°C (voltage)
  ± 0.2% of full range (current)
- **Bandwidth** 4 Hz
- **Input CMR at DC** 92 dB min.
- **Input Connections** 2, 3 or 4 wires
- **Input Type**

RTD type	α	Temperature Range (°C)
Pt	0.00385	-100 ~ 100
Pt	0.00385	0 ~ 100
Pt	0.00385	0 ~ 200
Pt	0.00385	0 ~ 600
Pt	0.00385	-100 ~ 0
Pt	0.00385	-100 ~ 200
Pt	0.00385	-50 ~ 50
Pt	0.00385	-50 ~ 150
Pt	0.00392	-100 ~ 100
Pt	0.00392	0 ~ 100
Pt	0.00392	0 ~ 200
Pt	0.00392	0 ~ 600
Ni	N/A	0 ~ 100
Ni	N/A	-80 ~ 100

- **Output Range** 0 ~ 5 V, 0 ~ 10 V, 0 ~ 20 mA
- **Output Resistance** < 5 Ω
- **Temperature Drift** ± 30 ppm of full range

General

- **Connectors** Screw terminal
- **Enclosure** ABS
- **Indicators** Power LED indicator
- **Isolation** 1,000 V_{DC}
- **Power Consumption** < 0.95 W
- **Power Input** 24 V_{DC} ±10%
- **Operating Temperature** 0 ~ 70°C (32 ~ 158°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-3013** Isolated RTD Input Module

Specifications

I/O

- **Accuracy** ±0.1% of full range (typical)
- **Common Mode Rejection** > 100 dB @ 50 Hz/60 Hz
- **Current Input** Bipolar: ±20 mA
  Unipolar: 0 ~ 20 mA
  Input impedance: 250 Ω
- **Current Output** 0 ~ 20 mA
- **Stability (Temperature Drift)** 150 ppm (typical)
- **Voltage Input** Bipolar input:
  ±10 mV, ±50 mV, ±100 mV, ±0.5 V, ±1.0 V, ±5 V, ±10 V
  Unipolar input:
  0 ~ 10 mV, 0 ~ 50 mV, 0 ~ 100 mV, 0 ~ 0.5 V, 0 ~ 1 V, 0 ~ 5 V, 0 ~ 10 V
  Input impedance: 2 MΩ
  Input bandwidth: 2.4 kHz (typical)
- **Voltage Output** Bipolar: ±5 V, ±10 V
  Unipolar: 0 ~ 10 V
  Impedance: < 50 Ω
  Drive: 10 mA max.

General

- **Connectors** Screw terminal
- **Enclosure** ABS
- **Indicators** Power LED indicator
- **Isolation (Three-way)** 1,000 V_{DC}
- **Power Consumption** 0.85 W (voltage output)
  1.2 W (current output)
- **Power Input** 24 V_{DC} ±10%
- **Operating Temperature** -10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-3014** Isolated DC Input/Output Module

ADAM-3016
ADAM-3112
ADAM-3114

Isolated Strain Gauge Input Module

Isolated AC Voltage Input Module

Isolated AC Current Input Module

ADAM-3016

ADAM-3112

ADAM-3114

Specifications

I/O

- **Accuracy** ±0.1% of full range
- **Bandwidth** 2.4 kHz (typical)
- **Isolation Mode Rejection** >100 dB @ 50 Hz/60 Hz
- **Current Output** Current: 0 ~ 20 mA
  Current load resistor: 0 ~ 500 Ω (Source)
- **Stability (Temperature Drift)** 150 ppm (typical)
- **Voltage Specifications** Electrical input: ±10 mV, ±20 mV, ±30 mV, ±100 mV
  Excitation voltage: 1 ~ 10 V_{DC} (60 mA max)
- **Voltage Output** Bipolar: ±5 V, ±10 V
  Unipolar: 0 ~ 10 V
  Impedance: < 50 Ω

General

- **Connectors** Screw terminal
- **Enclosure** ABS
- **Indicators** Power LED indicator
- **Isolation** 1,000 V_{DC} (Three-way)
- **Power Consumption** ≤ 1.85 W (voltage output)
  ≤ 2.15 W (current output)
- **Power Input** 24 V_{DC} ±10%
- **Operating Temperature** -10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-3016** Isolated Strain Gauge Input Module

Specifications

Voltage Input

Full Range Mode		400 V	250 V	120 V
Input Voltage	AC (V_{RMS})	0 ~ 400	0 ~ 250	0 ~ 120
	DC (V)	0 ~ 400	0 ~ 250	0 ~ 120
Input Impedance		48 k	30 k	14.4 k

Voltage Output

- **Output Signal** 0 ~ 5 V_{DC}
- **Accuracy** < ±1.0 % for full range
- **Output Impedance** < 10 Ω @ operating frequency <60 Hz
- **Load** > 10 k Ω
- **Ripple** < 120mVp-p
- **Temperature Coefficient** 400 ppm/°C
- **Input Bandwidth** 6 kHz

Power Consumption

- **Supply Voltage** 24 V_{DC} ± 10 %
- **Current Consumption** 40 mA

General

- **Isolation Protection** 1,000 V_{DC} (output to power)
  2,500 V_{RMS} (input to output, input to power)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95 %

Ordering Information

- **ADAM-3112** Isolated AC Voltage Input Module

Specifications

Current Input

- **AC Current Input** 0 ~ 5 A_{RMS}
- **DC Current Input** 0 ~ 5 A

Voltage Output

- **Output Signal** 0 ~ 5 V_{DC}
- **Accuracy** < ±1.0 % for full range
- **Output Impedance** <10 Ω @ operating frequency <60 Hz
- **Load** > 10 kΩ
- **Ripple** < 120 mVp-p
- **Temperature Coefficient** 400 ppm/°C
- **Input Bandwidth** 10 kHz

Power Consumption

- **Supply Voltage** 24 V_{DC} ± 10 %
- **Current Consumption** 40 mA

General

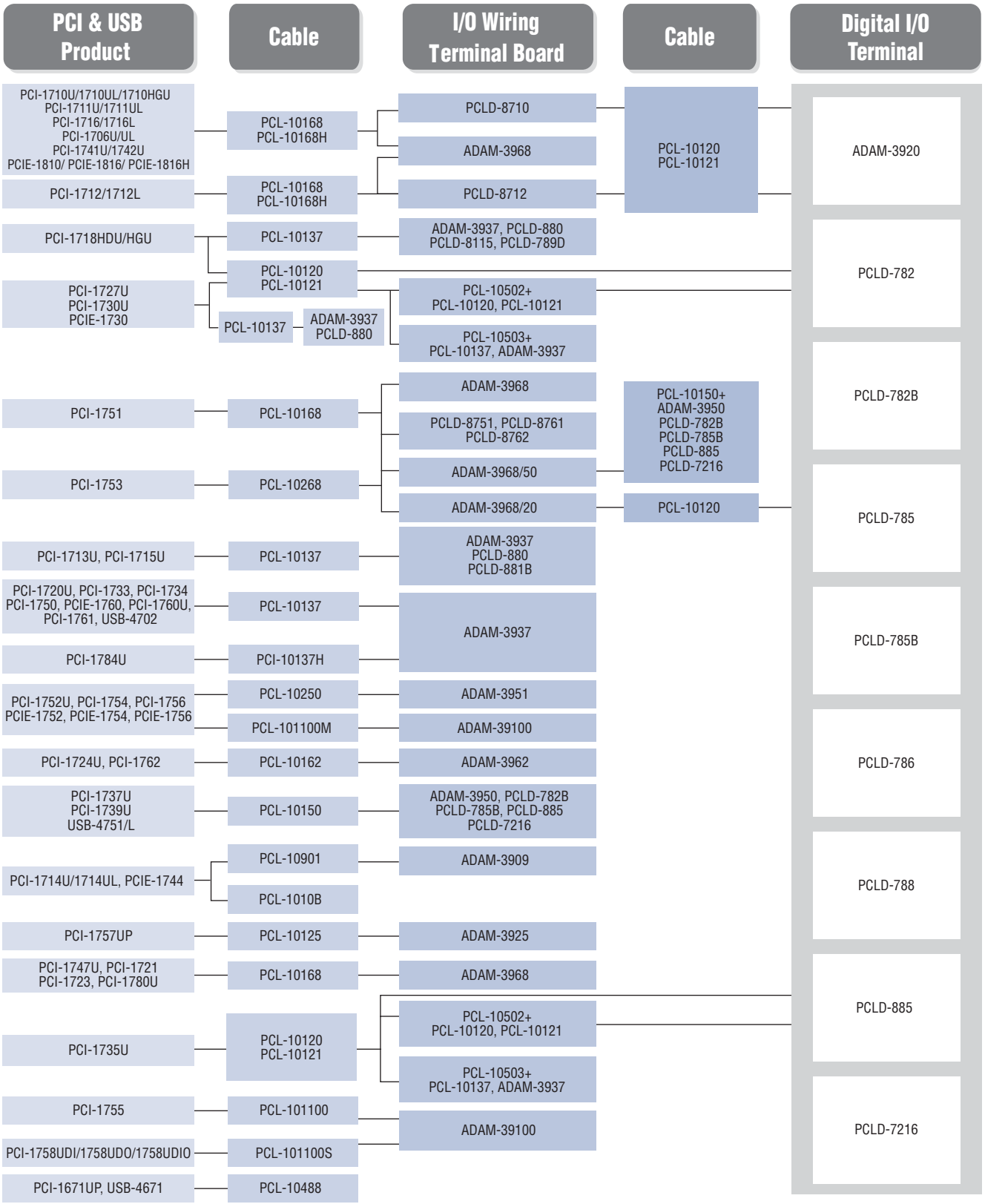
- **Isolation Protection** 1,000 V_{DC} (output to power)
  2,500 V_{RMS} (input to output, input to power)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95 %

Ordering Information

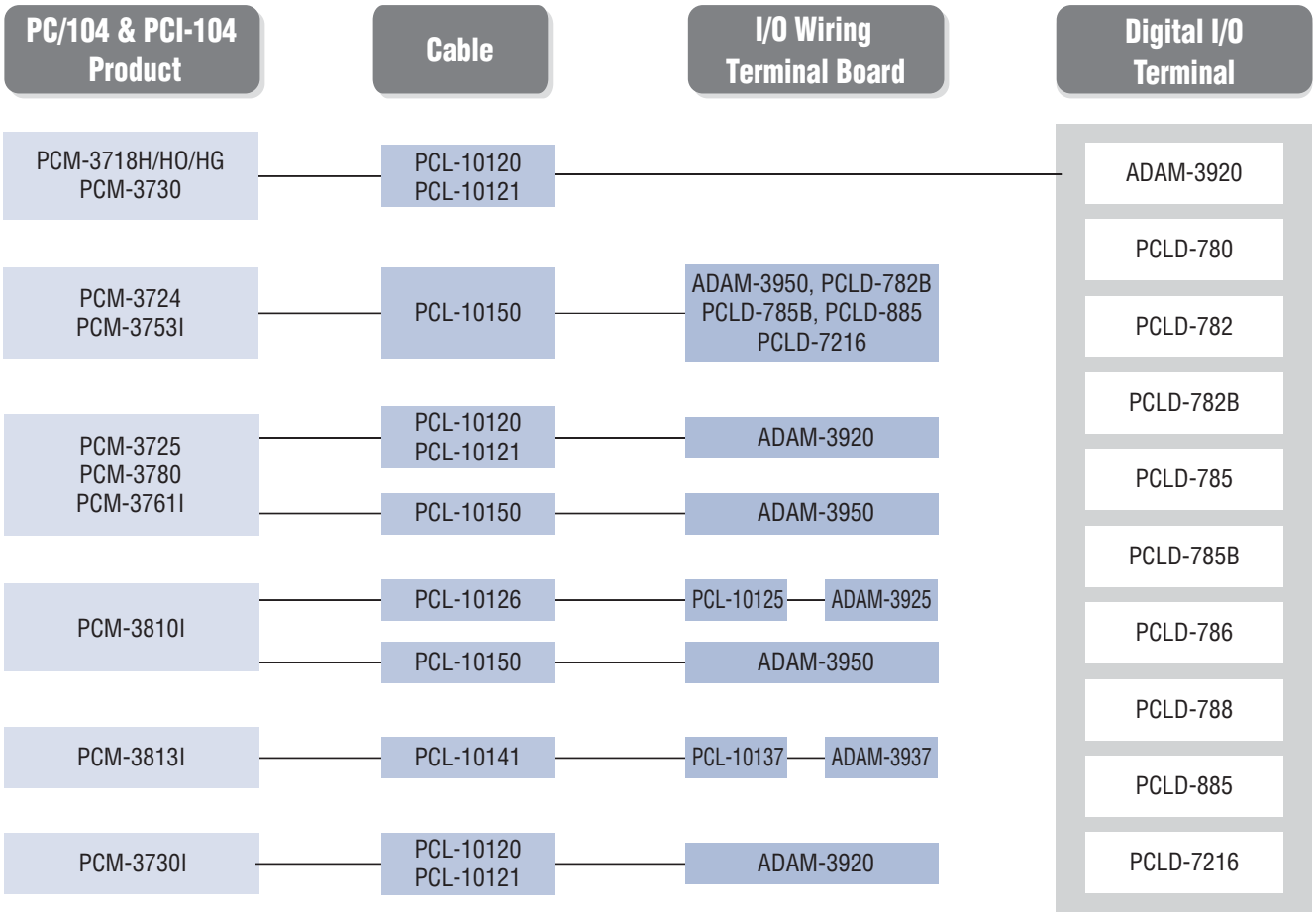
- **ADAM-3114** Isolated AC Current Input Module

Terminal Board Selection Guide

Recommended Cables, I/O Wiring Terminal Boards and Isolated Digital I/O Terminals for Connecting to PCI & USB Data Acquisition (DAQ) Products



Recommended Cables, I/O Wiring Terminal Boards and Isolated Digital I/O Terminals for Connecting to PC/104 & PCI-104 Data Acquisition (DAQ) Products



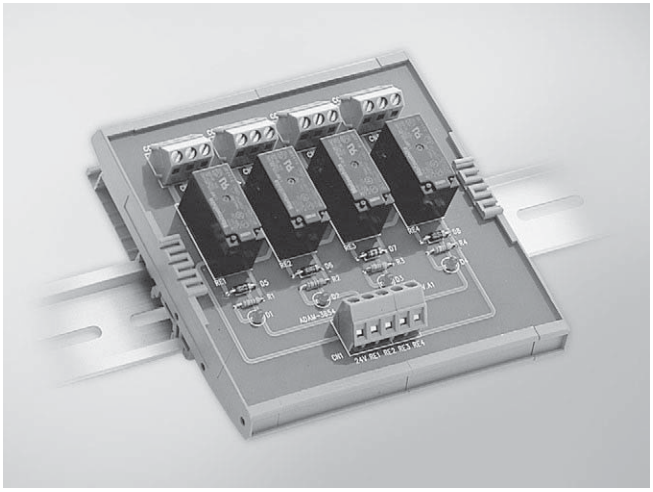
Cable Accessories

Model	Description
PCL-1010B-1E	BNC to BNC Wiring Cable, 1 m
PCL-101100-1E	100-pin SCSI High-Speed Cable, 1 m
PCL-101100S-1E	100-pin Mini-SCSI Cable, 1 m
PCL-101100S-2E	100-pin Mini-SCSI Cable, 2 m
PCL-101100S-3E	100-pin Mini-SCSI Cable, 3 m
PCL-101100M-3E	100-pin SCSI Shielded Cable, 3 m
PCL-10120-0.4E	20-pin Flat Cable, 0.4 m
PCL-10120-1E	20-pin Flat Cable, 1 m
PCL-10120-2E	20-pin Flat Cable, 2 m
PCL-10121-2E	20-pin Shielded Cable, 2 m
PCL-10125-1E	DB25 Cable, 1 m
PCL-10125-3E	DB25 Cable, 3 m
PCL-10126-0.2E	IDE#2 26-pin to DB25(F) Flat CABLE, 0.2m
PCL-10137-1E	DB37 Cable, 1 m
PCL-10137-2E	DB37 Cable, 2 m
PCL-10137-3E	DB37 Cable, 3 m
PCL-10137H-1E	DB37 High-Speed Cable, 1 m

Model	Description
PCL-10137H-3E	DB37 High-Speed Cable, 3 m
PCL-10141-0.2E	IDE#2 40-pin to DB37(F) Flat CABLE, 0.2m
PCL-10150-1.2E	50-pin Flat Cable, 1.2 m
PCL-10162-1E	DB62 Cable, 1 m
PCL-10162-3E	DB62 Cable, 3 m
PCL-10168-1E	68-pin SCSI Shielded Cable, 1 m
PCL-10168-2E	68-pin SCSI Shielded Cable, 2 m
PCL-10168H-1E	68-pin SCSI Shielded Cable with Noise Rejecting, 1m
PCL-10168H-2E	68-pin SCSI Shielded Cable with Noise Rejecting, 2m
PCL-10250-1E	100-pin SCSI to Two 50-pin SCSI Cable, 1 m
PCL-10250-2E	100-pin SCSI to Two 50-pin SCSI Cable, 2 m
PCL-10268-1E	100-pin SCSI to Two 68-pin SCSI Cables, 1 m
PCL-10268-2E	100-pin SCSI to Two 68-pin SCSI Cables, 2 m
PCL-10488-2	IEEE-488 Cable, 2 m
PCL-10502-AE	Extender, Extend Dual 20-pin to PC Slot-Plate
PCL-10503-AE	Adapter Dual 20-pin to DB37
PCL-10901-3E	DB9 to PS/2 Cable, 3 m

ADAM-3854
ADAM-3864

4-ch Power Relay Module
4-ch Solid State Digital I/O Module Carrier Backplane



ADAM-3854

Features

- High power relays can handle up to 5 A @ 250 V_{AC} and 5 A @ 30 V_{DC}
- 4 single-pole double-throw (SPDT) relays
- Industrial screw terminals for easy output wiring
- LED status indicators
- Onboard varistor protects relay contact points
- DIN-rail mounting

Specifications

I/O

- **Channels** 4
- **Contact Rating** 250 V_{AC} @ 5 A
30 V_{DC} @ 5 A
- **Contact Resistance** 100 mΩ
- **Operation Time** 15 ms max.
- **Relay Type** SPDT (Form C)
- **Release Time** 5 ms max.
- **Life Expectancy** 1.7 x 10^5 at rated load

Varistor

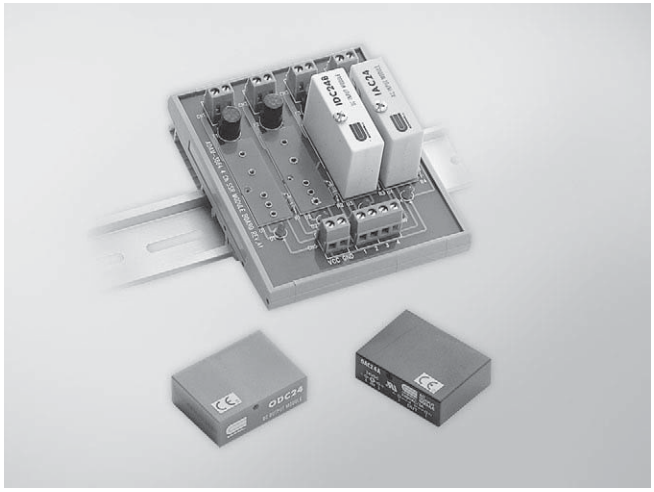
- **Clamping Voltage** 760 V (10 A)
- **Max. Applied Voltage** 300 V_{RMS}
- **Max. Peak Current** 1,200 A for 8 ms
- **Varistor Voltage** 470 V (current = 1 mA)

General

- **Connectors** Screw terminals
- **Dimensions (L x W x H)** 112.5 x 118.4 x 46 mm (4.43" x 4.66" x 1.81")
- **LED Indicators** Status displayed for each relay
- **Mounting** DIN-rail
- **Power Consumption** 2.2 W
- **Power Input** 24 V_{DC}

Ordering Information

- **ADAM-3854** 4-ch DIN-rail Power Relay Module



ADAM-3864

Features

- 2,500 V_{RMS} optical isolation
- LED status indicators
- Onboard fuse protection
- DIN-rail mounting

Specifications

Input Modules

Field Side:

- **Input On/Off Voltage** IAC24A series: 180 ~ 280 V/80 V_{RMS}
Range IDC24B series: 3 ~ 32 V/1 V_{DC}
- **Input Resistance** IAC24A series: 44 kΩ
IDC24B series: 1.5 kΩ

Logic Side:

- **Breakdown Voltage** 30 V_{DC}
- **Output Current** 100 mA max.
- **Output Voltage Drop** 0.4 V max.
- **Supply Current** 12 mA max.
- **Supply Voltage** 24 V_{DC}

Output Modules

Field Side:

- **Contact Voltage Drop** 1.6 V max.
- **Current Rating** 3 A max. (@ 25°C)

Logic Side:

- **Input Resistance** 220 Ω
- **Supply Current** 12 mA max.
- **Supply Voltage** 24 V

General

- **Dimensions (L x H x W)** 118.4 x 90 x 59 mm (4.66" x 3.54" x 2.32")
- **Mounting** DIN-rail

Ordering Information

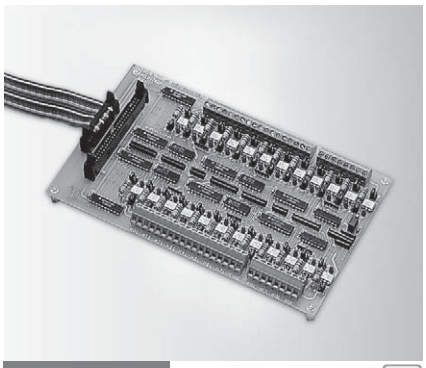
- **ADAM-3864** 4-ch Solid State Module Carrier Backplane
- **OAC24A** AC Output Module (24-280 V_{AC}, 3 A)
- **ODC24** DC Output Module (5-60 V_{DC}, 3 A)
- **PCLM-ODC5** Single Piece DC SSR Module (60 V_{DC}, 3 A)
- **IAC24A** AC Input Module (180-280 V_{AC})
- **IDC24B** DC Input Module (3-32 V_{DC})

PCLD-782/B
PCLD-785/B
PCLD-885

16/24-ch Opto-Isolated Digital Input Board

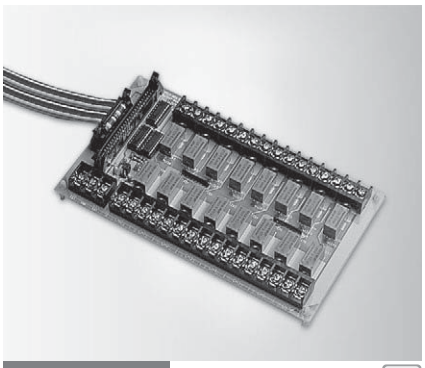
16/24-ch Relay Board

16-ch Power Relay Board



PCLD-782/B

PCLD-785/B



PCLD-885

Features

- Compatible with all PC-LabCard™ products with DI channels on either 20-pin flat cable or 50-pin Opto-22 compatible connectors
- 16 or 24 optically-isolated digital input channels
- Built-in screw terminals for easy input wiring
- LEDs indicate input logic status
- Inputs buffered with voltage comparators

Specifications

Isolated Digital Input

- **Channels** PCLD-782: 16
PCLD-782B: 24
- **Input Range** 0 ~ 24 V_{DC}
- **Input Resistance** 560 Ω
- **Isolation Voltages** 1,500 V_{DC} min.
- **Threshold Voltage** 1.5 V_{DC} (VR adjustable)

General

- **DI Connectors** Screw terminals (#12 ~ 22 AWG)
- **Controller Connector** PCLD-782: 1 x 20-pin box header (CN1)
PCLD-782B: 1 x 20-pin box header (CN1) and 1 x 50-pin box header (CN2)
- **Dimensions (L x W)** PCLD-782: 3U– 205 x 114 mm (8.1" x 4.5")
PCLD-782B: 4U– 220 x 132 mm (8.7" x 5.2")
- **LED Indicators** Indicates input logic status
- **Mounting** 4 x screw holes for flat surface mounting

Ordering Information

- **PCLD-782** 16-ch Isolated DI Board w/ 1m 20-pin Flat Cable
- **PCLD-782B** 24-ch IDI Board w/ 20-pin & 50-pin Flat Cables

Accessories

- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m
- **PCL-10150-1.2E** 50-pin Flat Cable, 1.2 m

Features

- Compatible with PC-LabCard™ products with 20-pin digital output connector and 50-pin Opto-22 digital output connector (PCLD-785B only)
- Automatic selection of control logic (PLCD-785B only): Negative logic for the Opto-22 connector Positive logic for the 20-pin flat cable connector
- Screw terminals for easy output wiring
- LED status indicators

Specifications

Relay

- **Channels** PCLD-785: 16 (CN1, 20-pin conn.)
PCLD-785B: 16 (CN1, 20-pin conn.)
24 (CN2, 50-pin conn.)
- **Contact Ratings** 120 V_{AC} @ 0.5 A, 30 V_{DC} @ 1 A
- **Contact Resistance** < 100 mΩ
- **Operation Time** 5 ms max.
- **Insulation Resist.** 100 MΩ
- **Life Expectancy** 5 x 10^5 @ 110 V_{AC} /0.3 A
5 x 10^5 @ 24 V_{DC} /1.25 A
- **Relay Type** SPDT (Single-Pole Double-Throw) Form C
- **Release Time** 5 ms max.

General

- **Dimensions (L x W)** PCLD-785: 114x220 mm
PCLD-785B: 132x220 mm
- **Power Consumption** 5 V @ < 100 mA; 12 V @ 33 mA for each relay
- **Power Input** 20-pin connector: 5 V_{DC}: Jumper select PC bus or external supply
12 V_{DC}: Jumper select PC bus or external supply
50-pin connector: external 12 V supply

Ordering Information

- **PCLD-785** 16-ch Relay Board w/ One 1m 20-pin Flat Cable
- **PCLD-785B** 24-ch Relay Board w/ 20-pin & 50-pin Flat Cables

Accessories

- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m
- **PCL-10150-1.2E** 50-pin Flat Cable, 1.2 m

Features

- Accepts 20-pin or 50-pin (Opto-22 compatible) connectors
- 16 single-pole single-throw (SPST) relays
- High-power relay handles up to 6 A @ 250 V_{AC}
- Onboard varistors protect all relay contact points
- Industrial screw terminals for ease of wiring
- LED status indicators
- 5 V/ 12 V power/status LED indicator

Specifications

Relay

- **Channels** 16
- **Contact Rating** 250 V_{AC} @ 6 A
30 V_{DC} @ 5 A
- **Contact Resistance** 30 mΩ max.
- **Insulation Resist.** 1,000 MΩ @ 500 V_{DC}
- **Life Expectancy** >100,000 cycles at rated load
- **Relay On Time** 6 ms max.
- **Relay Off Time** 3 ms max.
- **Relay Type** SPST (Form A), normally open

Varister

- **Clamping Voltage** 760 V (10 A)
- **Max. Peak Current** 1,200 A for 8 msec.
- **Max. Applied Voltage** 300 V_{RMS} AC continuous
- **Varistor Voltage** 470 V (current = 1 mA)

General

- **Power Consumption** 12 V @ 22 mA for each relay, 352 mA if all relays energized
5 V @ 200 mA max.
- **Connectors** Input: 20-pin flat cable or 50-pin Opto-22 compatible
Output: Barrier strip screw terminal
- **Dimensions (L x W)** 205 x 114 mm (8" x 4.5")
- **Operating Temp.** 0 ~ 60°C (32 ~ 140°F)

Ordering Information

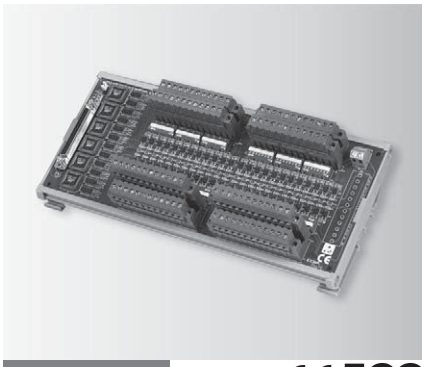
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables

PCLD-8751
PCLD-8761
PCLD-8762

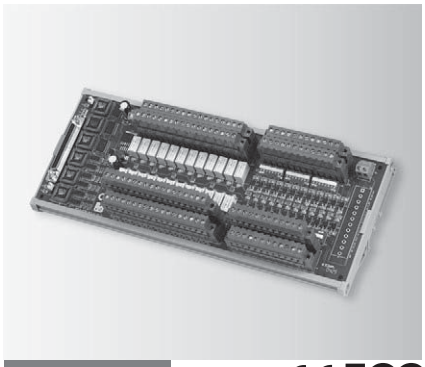
48-ch Opto-Isolated Digital Input Board

24-ch Opto-Isolated DI and 24-ch Relay Output Board

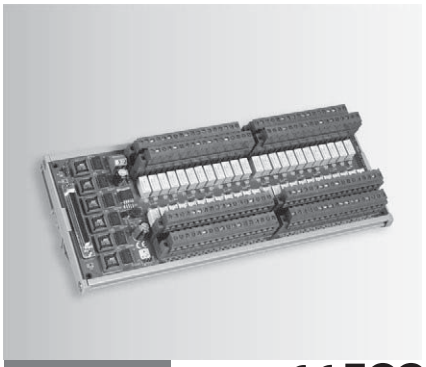
48-ch Relay Output Board



PCLD-8751 CE FCC



PCLD-8761 CE FCC



PCLD-8762 CE FCC

Features

- 48 optically-isolated digital input channels
- Built-in plug-in screw terminals for easier wiring
- LEDs indicate input logic status
- Input buffered with voltage comparators
- Wet/Dry contact set by DIP switches
- Input logic set by jumper
- Wide input range from 5 to 30 V

Specifications

Digital Input

- **Channels**: 48 isolated digital inputs
- **Contact Mode**: Wet contact
Dry contact (set by switch)
- **Isolation Voltage**: 3,500 V
- **Logic Modes**: Positive Logic
Negative Logic
(set by jumper)
- **Signal Voltage**: 0 ~ 30 V
VIH (MIN) : 4 V,
VIL (MAX) : 1 V

General

- **Certification**: CE, FCC
- **Connectors**: Cable: SCSI-68 pin
Signals: Plug-in screw terminals (#14 - 24 AWG)
- **Dimensions**: 255 x 121 mm
(10.04" x 4.76")
- **LED Indicators**: One for each channel to indicate logic status
- **Mounting**: DIN-rail

Ordering Information

- **PCLD-8751**: 48-ch Opto-isolated Digital Input Board

Features

- Built-in plug-in screw terminals for easier wiring
- LED status indicators for D/I and relay output
- Digital inputs buffered with voltage comparators
- Wet/Dry contact set by DIP switches for D/I
- Wide input range from 5 to 30 V
- INT/EXT Power selection by jumper

Specifications

Digital Input

- **Channels**: 24 IDI with LED
- **Contact Mode**: Wet contact and dry contact for each IDI (set by switch)
- **Digital Input**: 0 ~ 30 V VIH (MIN) : 4 V, VIL (MAX) : 1V
- **Isolation Voltage**: 3,500 V (Isolated DI), 1,500V (Relay)
- **Logic Mode (IDI and Relay are independent)**: Positive Logic
Negative Logic
(set by jumper)

Relay Output

- **Channels**: 24 SPDT (Form C)
- **Contact Rating**: 30 V_{DC} @ 1 A,
120 V_{AC} @ 0.5 A
- **Contact Resistance**: 100 mΩ
- **Electrical Endurance**: 5 x 10^7 times at 12 V/10 mA
- **Mechanical Endurance**: 10^8 times
- **Operation Time**: 5 ms Max
- **Release Time**: 6 ms Max

General

- **Certification**: CE, FCC
- **Connectors**: Cable: SCSI-68 pin
Signals: Plug-in screw terminals (#14 - 24 AWG)
- **Dimensions**: 285 x 121 mm
(11.22" x 4.76")
- **Mounting**: DIN-rail
- **Power Consumption**: +5 V @ < 380 mA +50*n (mA)
+12 V @ < 240 mA +70*n (mA)
(*n indicate the number of relays)
- **Power Selection**: PCI Bus or External power (7 ~ 30 V) by jumper

Ordering Information

- **PCLD-8761**: 24-ch Opto-isolated DI and 24-ch Relay (SPDT) Output Board

Features

- Built-in plug-in screw terminals for easier wiring
- LED status indicators for Relay output
- DIN-rail mounting
- Onboard relay driver circuits

Specifications

Relay Output

- **Channels**: 48 SPDT (Form C)
- **Contact Rating**: 30 V_{DC} @ 1 A,
120 V_{AC} @ 0.5 A
- **Contact Resistance**: 100 mΩ
- **Electrical Endurance**: 5 x 10^7 times at 12 V/10 mA
- **Mechanical Endurance**: 10^8 times
- **Operation Time**: 5 ms Max
- **Release Time**: 6 ms Max

General

- **Certification**: CE, FCC
- **Connectors**: Cable: SCSI-68 pin
Signals: Plug-in screw terminals (#14 - 24 AWG)
- **Dimensions**: 285 x 117 mm
(11.22" x 4.61")
- **Mounting**: DIN-rail
- **Power Input**: Unregulated 7 ~ 30 V_{DC}
- **Power Consumption**: 7 V @ 1.8 A,
30 V @ 0.45 A
(External power supply is required)

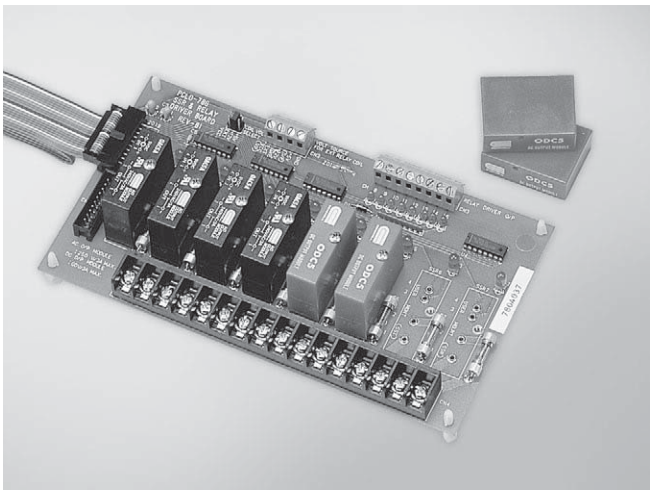
Ordering Information

- **PCLD-8762**: 48-ch Relay (SPDT) Output Board

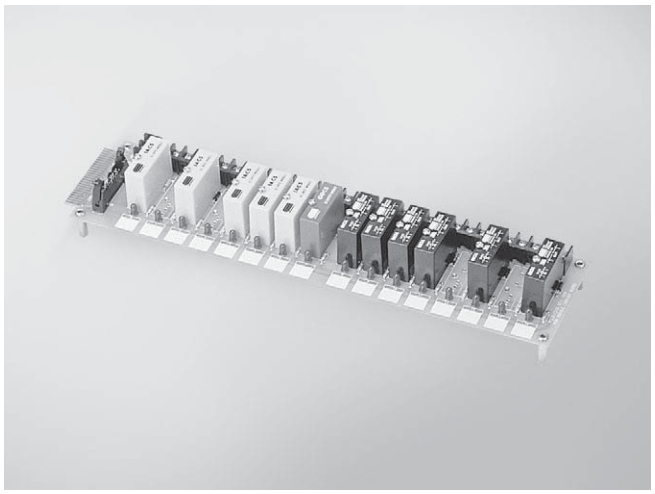
PCLD-786
PCLD-7216

8-ch SSR I/O Module Carrier Board

16-ch SSR I/O Module Carrier Board



PCL-10120-1 PCLD-786 PCLM-ODC5



PCLD-7216

Features

- Up to eight AC or DC solid state relay modules
- Photo-coupler isolated operation
- Eight external relay drivers
- LED status indicators

Specifications

AC Solid State Relays

- **1 Cycle Surge** 40 A
- **Blocking Voltage** ±600 V min.
- **Off Leakage Current** 8 mA max.
- **On-state Voltage** 1.6 V max.
- **Output Rating** 24 ~ 280 V_{AC} @ 3.0 A
- **Turn On** zero volts
- **Turn On/Turn Off Time** < ½ cycle
- **Type** PCLM-OAC5A

DC Solid State Relays

- **1 Second Surge** 5 A
- **OFF Leakage Current** 1 mA max.
- **ON-state Voltage** 1.4 V max.
- **Output Rating** 5 ~ 60 V_{DC} @ 3.0 A
- **Turn On/Turn Off Time** 750 µs max.
- **Type** PCLM-ODC5

External Relay Drivers

- **Channels** 8
- **Coil Driving Voltage** 5 V, 12 V from PC or external source
- **Driver Type** ULN2003, open collector type
- **Max. Driving Current** 125 mA each channel

General

- **Dimensions (L x W)** 205 x 114 mm (8.1" x 4.5")

Ordering Information

- **PCLD-786** 8-ch SSR I/O Module Board w/ 20-pin Flat Cable

Note: PCLD-786 does not include SSRs. They must be ordered by selecting single piece SSR modules according to your requirements.

- **PCLM-OAC5A** Single Piece AC SSR Module (280 V_{AC}, 3 A)
- **PCLM-ODC5** Single Piece DC SSR Module (60 V_{DC}, 3 A)

Features

- Channel status reflected by onboard LED for easy monitoring
- Onboard fuse protection

Specifications

Module Type		Field Side		Logic Side
Output Modules	**Part No.**	**Output Voltage Rating**	**Output Current Rating**	**Input Logic and SSR Status**
AC Output	PCLM-OAC5A	24 ~ 280 V_{AC}	3.0 A	TTL low (On)
		12 ~ 280 V_{AC}		TTL high (Off)
DC Output	PCLM-ODC5	5 ~ 60 V_{AC}	3.0 A	TTL low (On)
				TTL high (Off)
Input Modules	**Part No.**	**Input On Voltage**	**Input Off Voltage**	**Output Logic and On/Off Status**
AC Input	PCLM-IAC5A	180 ~ 280 V_{AC}	< 80 V	TTL low (On)
				TTL high (Off)
DC Input	PCLM-IDC5B	3 ~ 32 V_{AC}	< 1 V	TTL low (On)
				TTL high (Off)

Input Modules

Field Side:

- **Input On/Off Voltage Range** PCLM-IAC5: 90 ~ 140 V/45 V_{RMS}
  PCLM-IAC5A: 180 ~ 280 V/80 V_{RMS}
  PCLM-IDC5B: 3 ~ 32 V/1 V_{DC}
- **Input Resistance** PCLM-IAC5: 14 kΩ, PCLM-IAC5A: 44 kΩ,
  PCLM-IDC5B: 1.5 kΩ
- **Turn On/Off Time** PCLM-IAC5: 20 msec. max., PCLM-IAC5A: 20 msec. max.
  PCLM-IDC5B: 100 msec. max.

Logic Side:

- **Breakdown Voltage** 30 V_{DC}
- **Output Current** 100 mA max.
- **Output Voltage Drop** 0.4 V max.
- **Supply Current** 12 mA max.
- **Supply Voltage** 4 ~ 6 V

Output Modules

Field Side:

- **Current Rating** 3 A max. (@ 25°C)
- **Contact Voltage Drop** 1.6 V max.
- **Turn On/Off Time** PCLM-OAC series: ½ AC cycle max.
  PCLM-ODC series: 100 µsec/750 µsec. max.

Logic Side:

- **Input Resistance** 220 Ω
- **Supply Voltage** 4 ~ 6 V
- **Supply Current** 12 mA max.

General

- **Logic Side Connectors** 50-pin edge connector, Opto-22 compatible
- **Dimensions (L x W x H)** 367 x 111 x 56 mm (14.4" x 4.4" x 2.2")

Ordering Information

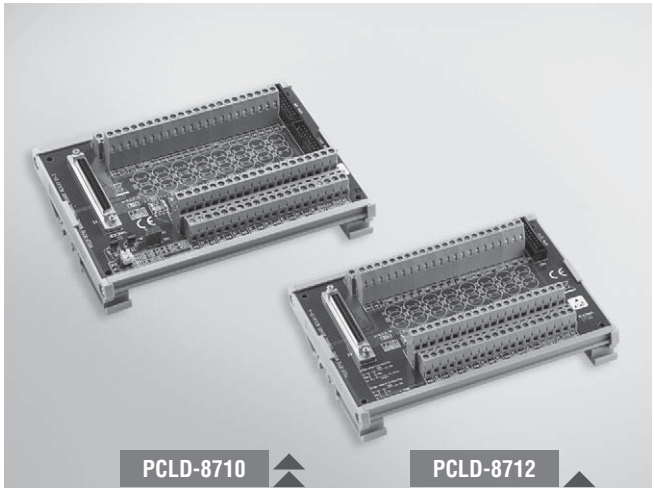
- **PCLD-7216** 16-ch SSR I/O Module Carrier Board

Note: PCLD-7216 does not include SSRs. They must be ordered by selecting single piece SSR modules according to your requirements.

PCLD-8710
PCLD-8712

DIN-rail Wiring Terminal Board with CJC Circuit

DIN-rail Wiring Terminal for PCI-1712/L



Features

- Low-cost screw-terminal with 68-pin SCSI-II connector
- Onboard CJC (Cold Junction Compensation) circuits for direct thermocouple measurement (PCLD-8710)
- Reserved space for signal-conditioning circuits such as low-pass filter, voltage attenuator and current shunt
- Industrial-grade screw-clamp terminal blocks for heavy-duty and reliable connections
- DIN-rail mounting case for easy mounting
- Supports PCI-1710U/UL, PCI-1710HGU, PCI-1711U/UL, PCI-1716/L (PCLD-8710) and PCI-1712/1712L (PCLD-8712)

Introduction

The PCLD-8710 is designed to match multifunction cards with 68-pin SCSI-II connectors, such as the PCI-1710U/UL, PCI-1710HGU, PCI-1711U/UL, PCI-1716/L cards. This screw-terminal board also includes cold junction sensing circuitry that allows direct measurements from thermocouple transducers. Together with software compensation and linearization, every thermocouple type can be accommodated. The PCLD-8712 Screw-terminal Board provides convenient and reliable signal wiring for the PCI-1712/L of which has a 68-pin SCSI-II connector.

Due to its special PCB layout you can install passive components to construct your own signal-conditioning circuits. The user can easily construct a low-pass filter, attenuator or current shunt converter by adding resistors and capacitors on board's circuit pads.

Applications

Field wiring for analog and digital I/O channels of PC-LabCard™ products.

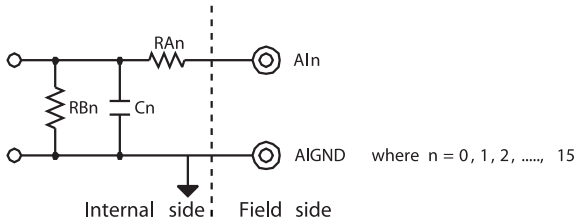
Signal conditioning circuits can be implemented as illustrated in the following examples:

a) Straight-through connection (factory setting)

RAn = 0 Ω (short)

RBn = none

Cn = none



b) 1.6 kHz (3 dB) low pass filter

RAn = 10 KΩ

RBn = none

Cn = 0.01 μF

$$f_{3dB} = \frac{1}{2\pi RAn.Cn}$$

c) 10 : 1 voltage attenuator:

RAn = 9 KΩ

RBn = 1 KΩ

Cn = none

$$\text{Attenuation} = \frac{R\ n}{RAn\ \ R\ n}$$

(Assume source impedance << 10 KΩ)

d) 4 ~ 20 mA to 1 ~ 5 V_{DC} signal converter:

RAn = 0 Ω (short)

RBn = 250 Ω (0.1% precision resistor)

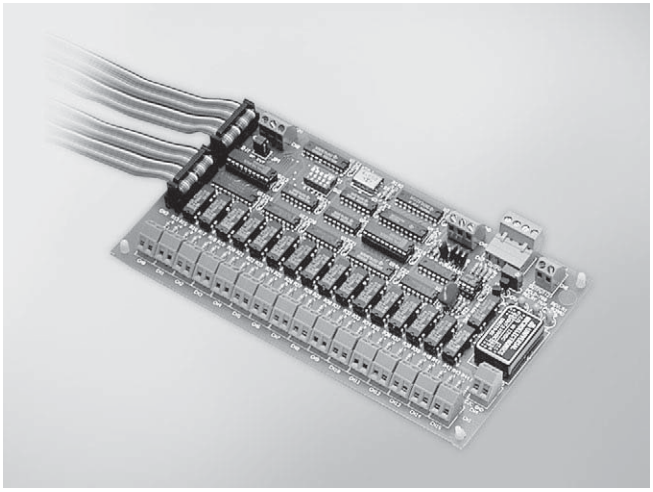
Cn = none

Ordering Information

- **PCLD-8710** DIN-rail Wiring Terminal Board with CJC Circuit
- **PCLD-8712** DIN-rail Wiring Terminal for PCI-1712/L
- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m

PCLD-788

16-ch Relay Multiplexer Board



Features

- 16 to 1 channel expansion
- Differential and fully isolated multiplexing
- Break-before-make relay control
- "Channel closed" signal for precise A/D triggering
- Up to 16 PCLD-788s can be cascaded for 256 channels
- Easy wiring for large channel count configuration
- Onboard cold-junction circuitry for thermocouple measurement

Introduction

PCLD-788 multiplexes 16 channels into a single I/O channel of an A/D converter, voltmeter or IEEE-488-based instrument. Up to 16 PCLD-788s can be cascaded for a total of 256 fully-isolated differential channels. The PCLD-788 can be controlled by any PC-LabCard™ product via a 16-bit 20-pin digital output port, found on cards such as the PCL-711B, PCL-812PG or the PCL-818 series. Channel selection (0-15) and board selection (0-15) are done by programming the high-order four bits and low order four bits of a digital output byte from the main I/O card in use.

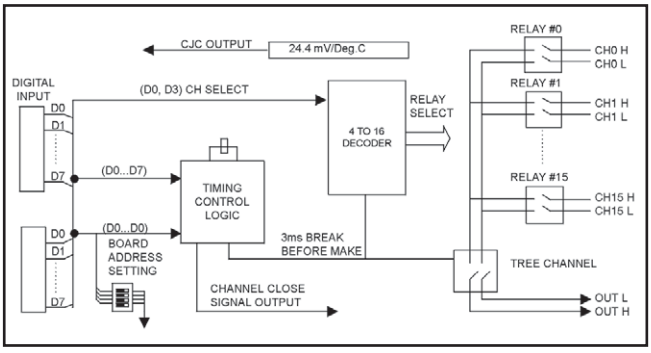
Specifications

I/O

- **Channel Closed Signal** TTL-level pulse
- **Cold-junction Sensor** 24.4 mV/°C, 0 V at 0°C Output
- **Contact Rating** Break-before-make with 3 msec. minimum break time
- **Contact Resistance** 200 mΩ max.
- **Input Channels** 16 isolated differential inputs
- **Programming** DO bit 0, 1, 2 and 3 for channel selection, DO bit 4, 5, 6 and 7 for board selection. Onboard DIP switches for board-address setting
- **Max. Input Voltage** 100 V_{DC} or 100 V peak AC
- **Max. Switching Current** 0.5 A
- **Max. Switching Power** 10 VA
- **Operating Time** 1 ms max.
- **Relay Life Expectancy** 100 million cycles min. at 10 V_{DC} and 1 mA
- **Release Time** 1 msec. max.

General

- **Connectors**
  - Controller: 2 x 20-pin box header, second connector in parallel for daisy chaining
  - I/O: Screw terminals
- **Dimensions (L x W)** 205 x 114 mm (8" x 4.5")
- **Mounting** 4 x screw holes for flat surface mounting
- **Power Consumption** 5 V @ 380 mA max.



PCLD-788 Block Diagram

Pin Assignments

CN2 & CN3

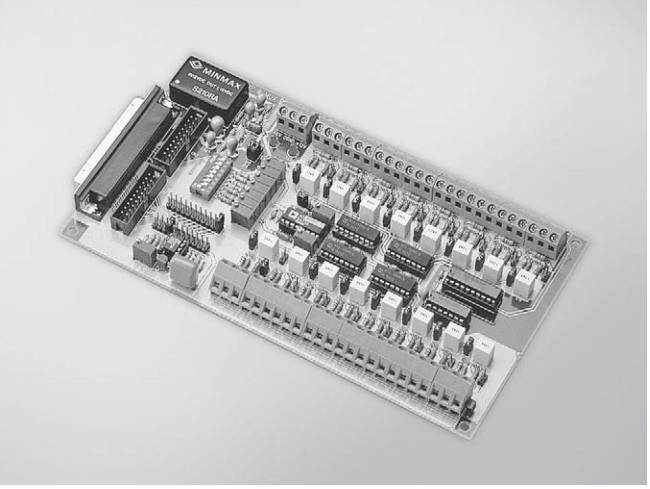
C0	1	2	C1
C2	3	4	C3
C4	5	6	C5
C6	7	8	C7
	9	10	
	11	12	
	13	14	
	15	16	
GND	17	18	GND
+5V	19	20	+12V

Ordering Information

- **PCLD-788** 16-ch Relay MUX Board w/ Two 20-pin Flat Cables
- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m

PCLD-789D

Amplifier and Multiplexer Board



Features

- Multiplexes 16 differential inputs to one A/D input
- Expands a PC-LabCard™ product's analog inputs to 128 channels
- High-grade instrumentation amplifier provides switch selectable gains of 1, 2, 10, 50, 100, 200, 1,000
- Onboard cold-junction compensation circuits for direct thermocouple measurement
- Built-in signal conditioning functions include filter, attenuator and current shunt
- Second connectors onboard allow daisy chaining
- Screw-clamp terminal blocks permit easy and reliable connections

Introduction

PCLD-789D is a front-end signal conditioning and channel multiplexing daughterboard for use with PC-LabCard™ product's analog input ports. It multiplexes 16 differential input channels into a single A/D converter input channel. You can cascade up to ten PCLD-789Ds, allowing a single data acquisition card to access 160 analog input channels.

PCLD-789D has DB37 and 20-pin flat cable connectors and lets your PCL-818L or PCL-818HD access up to 128 channels without using an additional digital output cable to select channels. The PCLD-789D uses a high-grade instrumentation amplifier that provides switch-selectable gains of 1, 2, 10, 50, 100, 200 and 1,000. This amplifier lets you accurately measure low-level signals with your PC-LabCard™ product. The board also contains a cold-junction sensing circuit that allows direct temperature measurement from thermocouple transducers. A wide variety of thermocouples are supported with software compensation and linearization.

Specifications

I/O

- **Cold-junction Compensation** 24.4 mV/°C, 0 V at 0°C
- **Input Channels** 16 differential
- **Input Conditions**

Gains	CMRR	Nonlinearity	Setting Time
1,000	125 dB	0.005% FSR	75 µsec.
100	115 dB	0.005% FSR	15 µsec.
10	105 dB	0.007% FSR	15 µsec.
1	85 dB	0.015% FSR	15 µsec.

- **Input Range** ±10 V max. depending on the selected gain
- **Output Range** ±10 V max.
- **Overvoltage Protection** ±30 V continuous

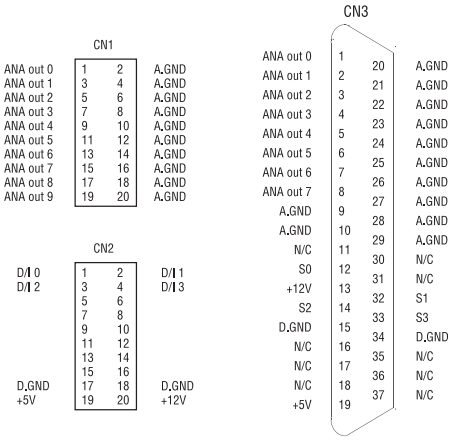
General

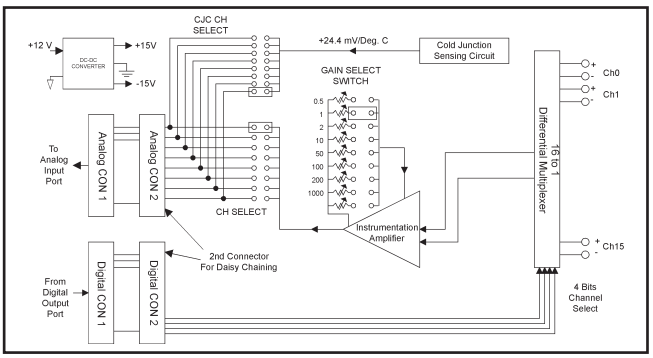
- **Connectors**
  Controller: 1 x DB37 male connector
  2 x 20-pin box header for daisy chaining
  I/O: Screw terminals
- **Dimensions (L x W)** 205 x 114 mm (8.1" x 4.5")
- **Mounting** 4 x screw holes for flat surface mounting
- **Power Consumption** 5 V @ 30 mA max, 12 V @ 80 mA max.

Ordering Information

- **PCLD-789D** Amplifier and Multiplexer Board w/ 1m DB37 Cable
- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m
- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m

Pin Assignments


CN1
ANA out 0 1 2 A.GND
ANA out 1 3 4 A.GND
ANA out 2 5 6 A.GND
ANA out 3 7 8 A.GND
ANA out 4 9 10 A.GND
ANA out 5 11 12 A.GND
ANA out 6 13 14 A.GND
ANA out 7 15 16 A.GND
ANA out 8 17 18 A.GND
ANA out 9 19 20 A.GND
CN2
D/I 0 1 2 D/I 1
D/I 2 3 4 D/I 3
5 6
7 8
9 10
11 12
13 14
15 16
D.GND 17 18 D.GND
+5V 19 20 +12V
CN3
ANA out 0 1 20 A.GND
ANA out 1 2 21 A.GND
ANA out 2 3 22 A.GND
ANA out 3 4 23 A.GND
ANA out 4 5 24 A.GND
ANA out 5 6 25 A.GND
ANA out 6 7 26 A.GND
ANA out 7 8 27 A.GND
A.GND 9 28 A.GND
A.GND 10 29 A.GND
N/C 11 30 N/C
S0 12 31 N/C
+12V 13 32 S1
S2 14 33 S3
D.GND 15 34 D.GND
N/C 16 35 N/C
N/C 17 36 N/C
N/C 18 37 N/C
+5V 19



Block Diagram